

### Computing and ICT Year Plan

| Term                          | Year 1                                                                                                                                                                                                                                                                                                                    | Year 2                                                                                                                                                                                                                                                                                                                        | Year 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Year 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Year 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Year 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <b>Autumn 1</b>               |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                               | <b>Technology around us</b><br>In this unit, learners will develop their understanding of technology and how it can help us. They will start to become familiar with the different components of a computer by developing their keyboard and mouse skills. Learners will also consider how to use technology responsibly. | <b>Information technology around us</b><br>In this unit, learners will look at information technology at school and beyond, in settings such as shops, hospitals, and libraries. Learners will investigate how information technology improves our world, and they will learn about using information technology responsibly. | <b>Connecting computers</b><br>During this unit, learners will develop their understanding of digital devices, with an initial focus on inputs, processes, and outputs. They also compare digital and non-digital devices. Following this, learners are introduced to computer networks, including devices that make up a network's infrastructure, such as wireless access points and switches. The unit concludes with learners discovering the benefits of connecting devices in a network. | <b>The internet</b><br>During this unit learners will apply their knowledge and understanding of networks, to appreciate the internet as a network of networks which need to be kept secure. They will learn that the World Wide Web is part of the internet, and be given opportunities to explore the World Wide Web for themselves to learn about who owns content and what they can access, add, and create. Finally they will evaluate online content to decide how honest, accurate, or reliable it is, and understand the consequences of false information. | <b>Sharing information</b><br>In this unit, learners will develop their understanding of computer systems and how information is transferred between systems and devices. Learners will consider small-scale systems as well as large-scale systems. They will explain the input, output, and process aspects of a variety of different real-world systems. Learners will also take part in a collaborative online project with other class members and develop their skills in working together online. | <b>Communication</b><br>In this unit, the class will learn about the World Wide Web as a communication tool. First, they will learn how we find information on the World Wide Web, through learning how search engines work (including how they select and rank results) and what influences searching, and through comparing different search engines. They will then investigate different methods of communication, before focusing on internet-based communication. Finally, they will evaluate which methods of internet communication to use for particular purposes. |
| <b>Cross Curricular links</b> |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                               | <b>Maths (lesson 1)</b> <ul style="list-style-type: none"> <li><b>Number and place value:</b><br/>Solve number problems and practical problems</li> </ul>                                                                                                                                                                                                                                                                                                                                      | <b>PSHE (Lesson 6)</b> <ul style="list-style-type: none"> <li>Evaluating content for honesty and accuracy</li> </ul><br><b>Art (Lesson 3)</b>                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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| <b>Autumn 2</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                 | <b>Moving Robot</b><br>This unit introduces learners to early programming concepts. Learners will explore using individual commands, both with other learners and as part of a computer program. They will identify what each floor robot command does and use that knowledge to start predicting the outcome of programs. The unit is paced to ensure time is spent on all aspects of programming and builds knowledge in a structured manner. Learners are also | <b>Robot Algorithms</b><br>This unit develops pupils' understanding of instructions in sequences and the use of logical reasoning to predict outcomes. Pupils will use given commands in different orders to investigate how the order affects the outcome. Pupils will also learn about design in programming. They will develop artwork and test it for use in a program. They will design algorithms and then test those algorithms as programs and debug them. | <b>Sequence in music</b><br>This unit explores the concept of sequencing in programming through Scratch. It begins with an introduction to the programming environment, which will be new to most learners. They will be introduced to a selection of motion, sound, and event blocks which they will use to create their own programs, featuring sequences. The final project is to make a representation of a piano. The unit is paced to focus on all aspects of sequences, and make sure that knowledge is | <b>Repetition in shape</b><br>This unit is the first of the two programming units in Year 4, and looks at repetition and loops within programming. Pupils will create programs by planning, modifying, and testing commands to create shapes and patterns. They will use Logo, a text-based programming language. | <b>Selection in physical computing</b><br>In this unit, learners will use physical computing to explore the concept of selection in programming through the use of the Crumble programming environment. Learners will be introduced to a microcontroller (Crumble controller) and learn how to connect and program components (including output devices — LEDs and motors) through the application of their existing programming knowledge. Learners will be introduced to conditions as a means of controlling the flow of actions, and explore how these can be used in algorithms and programs through the use of an input device (push | <b>Variables in games</b><br>This unit explores the concept of variables in programming through games in Scratch. First, pupils will learn what variables are, and relate them to real-world examples of values that can be set and changed. Pupils will then use variables to create a simulation of a scoreboard. In Lessons 2, 3, and 5, which follow the Use-Modify-Create model, pupils will experiment with variables in an existing project, then modify them, then they will create their own project. In Lesson 4, pupils will focus on design. Finally, in Lesson 6, pupils |

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|                               | introduced to the early stages of program design through the introduction of algorithms. |                                                                        | built in a structured manner. Learners also apply stages of program design through this unit. |                                                                                  | switch). Learners will make use of their knowledge of repetition and conditions when introduced to the concept of selection (through the 'if... then...' structure) and write algorithms and programs that utilise this concept. To conclude the unit, learners will design and make a working model of a fairground carousel that will incorporate their understanding of how the microcontroller and its components are connected, and how selection can be used to control the operation of the model. Throughout this unit, pupils will apply the stages of programming design. | will apply their knowledge of variables and design to improve their game in Scratch. |
| <b>Cross Curricular links</b> |                                                                                          |                                                                        |                                                                                               |                                                                                  | <b>Science – Electricity (Year 4)</b> <ul style="list-style-type: none"> <li>construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, <b>switches</b> and buzzers</li> </ul>                                                                                                                                                                                                                                                                                                                                            |                                                                                      |
| <b>Spring 1</b>               |                                                                                          |                                                                        |                                                                                               |                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                      |
|                               | <b>Online safety</b><br><br>During this unit, children will learn to                     | <b>Online safety</b><br><br>During this unit pupils will consider what | <b>Online Safety</b><br><br>During this unit, learners will be taught how to                  | <b>Online Safety</b><br><br>In this unit pupils will explore what information is | <b>Online Safety</b><br><br>Pupils will look more deeply into the concept of their digital                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Online Safety</b><br><br>During this unit, learners will develop online safety    |

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|                               | <p>talk about what is safe/unsafe online. They will also gain an understanding of what is classed as personal information and the importance of talking to a trusted adult before sharing anything about themselves. Learners will also consider issues around sharing photographs of themselves.</p>                                                       | <p>information is classed as personal and will gain an understanding of what makes a screen name suitable. Learners will also explore issues of risk around sharing photographs of themselves</p>                                                                                                                                                                                                               | <p>keep private information safe in games and apps and how to create a safe password. Online identity will also be considered and how communicating online is different to face-to-face.</p>                                                                                                                                            | <p>appropriate to be put online. They will also consider what a digital footprint is and look into plagiarism and how to access copyright free images. Finally, children will be asked to compare online activities vs off line activities and think about the relative merits of each.</p>                                                                                                                                                                                         | <p>footprint and consider consequences.</p> <p>They will also explore risks involved in sharing videos publicly and will consider how technology can be used positively. Finally, children will learn about appropriate downloading.</p>                                                                                                                               | <p>habits and learn how to keep personal information private when online.</p> <p>After that, they will gain an understanding about what to trust online, then learn how to critically evaluate what they see on social media. Finally, they will explore what to do when they have concerns with what they have experienced online and then they will consider how to build healthy online friendships.</p> |
| <b>Cross Curricular links</b> |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <b>Spring 2</b>               |                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                             |
|                               | <p><b>Digital painting</b></p> <p>During this unit, learners develop their understanding of a range of tools used for digital painting. They then use these tools to create their own digital paintings, while gaining inspiration from a range of artists' work. The unit concludes with learners considering their preferences when painting with and</p> | <p><b>Pictograms</b></p> <p>This unit introduces the learners to the term 'data'. Learners will begin to understand what data means and how this can be collected in the form of a tally chart. They will learn the term 'attribute' and use this to help them organise data. They will then progress onto presenting data in the form of pictograms and finally block diagrams. Learners will use the data</p> | <p><b>Stop frame animation</b></p> <p>During this unit, learners will use a range of techniques to create a stop frame animation using tablets. Next, they will apply those skills to create a story-based animation. This unit will conclude with learners adding other types of media to their animation, such as music and text.</p> | <p><b>Data logging</b></p> <p>In this unit, pupils will consider how and why data is collected over time. Pupils will consider the senses that humans use to experience the environment and how computers can use special input devices called sensors to monitor the environment. Pupils will collect data as well as access data captured over long periods of time. They will look at data points, data sets, and logging intervals. Pupils will spend time using a computer</p> | <p><b>Flat-file databases</b></p> <p>This unit looks at how a flat-file database can be used to organise data in records. Pupils use tools within a database to order and answer questions about data. They create graphs and charts from their data to help solve problems. They use a real-life database to answer a question, and present their work to others.</p> | <p><b>Web page creation (Google Sites)</b></p> <p>This unit introduces learners to the creation of websites for a chosen purpose. Learners identify what makes a good web page and use this information to design and evaluate their own website using Google Sites. Throughout the process learners pay specific attention to copyright and fair use of media, the</p>                                     |

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|                               | without the use of digital devices.                                                                                                                                                                                                                                                                                                                                                                                                     | presented to answer questions.                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                   | to review and analyse data. Towards the end of the unit, pupils will pose questions and then use data loggers to automatically collect the data needed to answer those questions.                                                                                                                                                                                                                                                                                                                                                                                           |  | aesthetics of the site, and navigation paths                                                                                                                                                                                                  |
| <b>Cross Curricular links</b> | <p>KS1 Art and Design</p> <p>Pupils should be taught:</p> <ul style="list-style-type: none"> <li>To develop a wide range of art and design techniques in using colour, pattern, texture, line, shape, form, and space</li> <li>About the work of a range of artists, craft makers, and designers, describing the differences and similarities between different practices and disciplines and making links to their own work</li> </ul> | <p>Maths</p> <p>Building on Year 1 number and place value:</p> <ul style="list-style-type: none"> <li>Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: 'equal to', 'more than', 'less than' ('fewer'), 'most', 'least'</li> </ul> <p>Year 2</p> <ul style="list-style-type: none"> <li>interpret and construct simple pictograms, tally charts, block diagrams and simple tables</li> </ul> | <p>Literacy links</p> <ul style="list-style-type: none"> <li>Pupils should be taught to: draft and write by: in narratives, creating settings, characters and plot</li> <li>Pupils should be taught to: proof-read for spelling and punctuation errors</li> </ul> | <p>Science – Lower key stage 2/Year 4</p> <ul style="list-style-type: none"> <li>making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data.</li> </ul> |  | <p>English links</p> <ul style="list-style-type: none"> <li>Writing composition: Identifying the audience for and purpose of the writing, selecting the appropriate form, and using other similar writing as models for their own.</li> </ul> |

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|                          |                                                                                                                                                               | <ul style="list-style-type: none"> <li>ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity</li> <li>ask and answer questions about totalling and comparing categorical data</li> </ul> <p>Notes and guidance: Pupils record, interpret, collate, organise and compare information (for example, using many-to-one correspondence in pictograms with simple ratios 2, 5, 10).</p> |                                                                                                                                                               |                                                                                                                                                                                                       |                                                                                                                                                                                                          |                                                                                                                                                                         |
| <b>Summe<br/>r<br/>1</b> |                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                               |                                                                                                                                                                                                       |                                                                                                                                                                                                          |                                                                                                                                                                         |
|                          | <b>Digital writing</b><br><br>During this unit, learners will develop their understanding of the various aspects of using a computer to create and manipulate | <b>Programming quizzes</b><br><br>This unit initially recaps on learning from the Year 1 ScratchJr unit 'Programming B – Programming animations'. Learners begin to                                                                                                                                                                                                                                                                                    | <b>Events and actions</b><br><br>This unit explores the links between events and actions, while consolidating prior learning relating to sequencing. Learners | <b>Repetition in games</b><br><br>This unit explores the concept of repetition in programming using the Scratch environment. It begins with a Scratch activity similar to that carried out in Logo in | <b>Video editing</b><br><br>This unit gives learners the opportunity to learn how to create short videos in groups. As they progress through this unit, they will be exposed to topic-based language and | <b>Introduction to spreadsheets</b><br><br>This unit introduces the learners to spreadsheets. They will be supported in organising data into columns and rows to create |

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|                                      | <p>text. Learners will become more familiar with using a keyboard and mouse to enter and remove text. Learners will also consider how to change the look of their text, and will be able to justify their reasoning in making these changes. Finally, learners will consider the differences between using a computer to create text, and writing text on paper. They will be able to explain which method they prefer and explain their reasoning for choosing this.</p> | <p>understand that sequences of commands have an outcome, and make predictions based on their learning. They use and modify designs to create their own quiz questions in ScratchJr, and realise these designs in ScratchJr using blocks of code. Finally, learners evaluate their work and make improvements to their programming projects.</p> | <p>begin by moving a sprite in four directions (up, down, left, and right). They then explore movement within the context of a maze, using design to choose an appropriately sized sprite. This unit also introduces programming extensions, through the use of Pen blocks. Learners are given the opportunity to draw lines with sprites and change the size and colour of lines. The unit concludes with learners designing and coding their own maze-tracing program.</p> | <p>Programming unit A, where learners can discover similarities between two environments. Learners look at the difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. Their final project is to design and create a game which uses repetition, applying stages of programming design throughout.</p> | <p>develop the skills of capturing, editing, and manipulating video. Active learning is encouraged through guided questions and by working in small groups to investigate the use of devices and software. Learners are guided with step-by-step support to take their idea from conception to completion. At the teacher's discretion, the use of green screen can be incorporated into this unit. At the conclusion of the unit, learners have the opportunity to reflect on and assess their progress in creating a video.</p> | <p>their own data set. Learners will be taught the importance of formatting data to support calculations, while also being introduced to formulas and will begin to understand how they can be used to produce calculated data. Learners will be taught how to apply formulas that include a range of cells, and apply formulas to multiple cells by duplicating them. Learners will use spreadsheets to plan an event and answer questions. Finally, learners will create graphs and charts, and evaluate their results in comparison to questions asked.</p> |
| <p><b>Cross Curricular links</b></p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>Internet safety</b></p> <ul style="list-style-type: none"> <li>● Recognise inappropriate content, contact, and conduct and know how to report concerns</li> <li>● Use technology safely, respectfully, and responsibly; recognise acceptable/unacceptable behaviour</li> <li>● Identify a range of ways to report</li> </ul>                                                                                                                                                                                                | <p><b>National curriculum maths links</b></p> <p><b>Number – addition, subtraction, multiplication, and division:</b></p> <ul style="list-style-type: none"> <li>● Solve problems involving addition, subtraction, multiplication, and division</li> </ul>                                                                                                                                                                                                                                                                                                     |

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| <b>Summer 2</b> |                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                 | <b>Programming animations</b><br><br>This unit introduces learners to on-screen programming through ScratchJr. Learners will explore the way a project looks by investigating sprites and backgrounds. They will use programming blocks to use, modify, and create programs. Learners will also be introduced to the early stages of program design through the introduction of algorithms. | <b>Digital photography</b><br><br>Through the lessons in this unit, learners will learn to recognise that different devices can be used to capture photographs and will gain experience capturing, editing, and improving photos. Finally, they will use this knowledge to recognise that images they see may not be real. | <b>Branching databases</b><br><br>During this unit, learners will develop their understanding of what a branching database is and how to create one. They will gain an understanding of what attributes are and how to use them to sort groups of objects by using yes/no questions. The learners will create physical and on-screen branching databases. Finally, they will evaluate the effectiveness of branching databases and will decide what types of | <b>Photo editing</b><br><br>In this unit, learners will develop their understanding of how digital images can be changed and edited, and how they can then be resaved and reused. They will consider the impact that editing images can have, and evaluate the effectiveness of their choices. | <b>Selection in Quizzes</b><br><br>In this unit, pupils develop their knowledge of 'selection' by revisiting how 'conditions' can be used in programming, and then learning how the 'if... then... else...' structure can be used to select different outcomes depending on whether a condition is 'true' or 'false'. They represent this understanding in algorithms, and then by constructing programs using the Scratch programming environment. They learn how to write programs that ask questions and use selection to control the outcomes based on the answers given. They use this knowledge to design a quiz in | <b>Sensing</b><br><br>This unit is the final KS2 programming unit and brings together elements of all the four programming constructs: sequence from Year 3, repetition from Year 4, selection from Year 5, and variables (introduced in Year 6 – 'Programming A'. It offers learners the opportunity to use all of these constructs in a different, but still familiar environment, while also utilising a physical device — the micro:bit. The unit begins with a simple program for learners to build in and test in the programming environment, |



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|                               |  |                                                                                                                                                   | data should be presented as a branching database. |  | response to a given task and implement it as a program. To conclude the unit, learners evaluate their program by identifying how it meets the requirements of the task, the ways they have improved it, and further ways it could be improved. | before transferring it to their micro:bit. Learners then take on three new projects in Lessons 2, 3, and 4, with each lesson adding more depth.<br><br>In the final lesson, learners will apply their knowledge of the programming constructs and use their design to create their own micro:bit-based step counter. |
| <b>Cross Curricular links</b> |  | <b>Art and design</b><br><br>To develop a wide range of art and design techniques in using colour, pattern, texture, line, shape, form, and space |                                                   |  |                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                      |

### Computing Curriculum – key stages 1 and 2 Subject content

#### Key stage 1

*Pupils should be taught to:*

1. Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.
2. Create and debug simple programs.
3. Use logical reasoning to predict the behaviour of simple programs.
4. Use technology purposefully to create, organise, store, manipulate and retrieve digital content.
5. Recognise common uses of information technology beyond school.
6. Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

#### Key stage 2

*Pupils should be taught to:*

- A. Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.
- B. Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.
- C. Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.
- D. Understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration.
- E. Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.
- F. Select, use and combine a **variety** of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.
- G. Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.